



**CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY**

Name(s) Reagan Risk	Project Number S0321
Project Title To Surge or Not to Surge: Modeling the CVWD Gravity-Fed Canal Water Surges as Determined in USBR Monograph 17	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Model USBR Monograph 17 which describes the surge issues causing water loss in the Coachella Valley Water District's (CVWD) gravity fed canal system.</p> <p>During a prior year's project, I was traveling in Alaska and observed the Alaska Pipeline and was fascinated by how oil was transported from the Arctic Ocean to the ports of Alaska. Upon my return to California, I saw the canal system that brings water from the Colorado River to Los Angeles. That sparked my interest in this subject.</p> <p>Methods/Materials Design a series of clear baffles and tubing, ranging from 6-10 inches in height. Connect baffles in series. Allow 8 liters of water to flow through the system and observe location & timing of any surge/water flow issues.</p> <p>Results Backflow and surges occurred numerous times, ranging from 0:21 to 2:19 into the tests. The causes were (1) end line was not primed, (2) change in hose diameter, and (3) pressure/water flow differential in the system.</p> <p>Conclusions/Discussion The Coachella Valley Water District's canal system is gravity fed. Surging issues have occurred and were documented in the USBR Monograph 17. I modeled this system to recreate the issues using clear tubing and baffles so that I could observe the issues.</p> <p>The backflow and surging issues caused by sediments and sands are a significant problem. Additionally, if end-user issues cause a drop or increase in pressure in the system or a lack of priming in the system, then surging and related water loss can occur.</p>	
Summary Statement Model USBR Monograph 17 which describes the surge issues causing water loss in the Coachella Valley Water District's (CVWD) gravity-fed canal system.	
Help Received I consulted with CVWD Engineer Dan Charlton to review the CVWD canal system & USBR Monograph 17.	